TABLE OF CONTENTS

3.1 GEOMETRICS AND LOADING

The structure location is determined by the alignment of the highway or railroad being carried by the bridge and the alignment of the feature being crossed. If the bridge is on a horizontal curve, refer to Figure 3.5 to determine the method used for bridge layout. The method of transition from tangent to curve is shown in Figures 3.1 to 3.4. Layout structures on the skew when the skew angle exceeds 2 degrees; otherwise detail structures showing a zero skew.

For highway structures, the minimum desirable longitudinal vertical gradient is 0.5 percent. There have been ponding problems on bridges with smaller gradients.

The clearances required on highway crossings are given in the Facilities Development Manual (FDM). The recommended clearance for railroad crossings are shown on Bridge Standard 38.1. All proposed railroad clearances must be approved by the Railroad involved.

Highway bridge design live loadings are AASHTO standard loadings using HS25 for strength design. Steel bridges are designed with HS20 for fatigue and HS20 for deflection with an L/1200 limit. Other bridge types use HS20 for serviceability requirements. This design criteria for LFD more closely resembles the HL-93 live load for LRFD.

Railroad loadings are specified in the AREMA Manual for Railway Engineering.

All new bridges constructed in the State of Wisconsin are designed for the following clearances which is measured from the shoulders:

Bridges Over Interstate & State Trunk Highways	-	16-3 to16-9 (5.0m to 5.1m)
Bridges Over Other Highways	-	14-9 to 15-3 (4.5m to 4.6m)
Bridges Over Railroads - Above Highest Rail	-	23-0 to 23- 3 ½ (7.01m to 7.1 m)
Wires and Cables Over Highways	-	18-0 to 22-0 (5.5m to 6.7m)
Pedestrian Bridges	-	17-3 to 17-9 (5.25m to 5.4m)
Sign Bridges	-	18-0 to 18-3 (5.49m to 5.56m)

Minimum clearances shown in the Bridge Log are field measured from the edge of roadway.

Sidewalks on bridges shall be designed a minimum of 6 feet wide. Refer to the FDM for more details.

3.2 SPECIFICATIONS AND STANDARDS

All bridges in the State of Wisconsin carrying highway traffic are to be designed to the Specifications of the American Association of State Highway and Transportation Officials (AASHTO) for Highway Bridges, the American Society for Testing and Materials (ASTM), the American Welding Society (AWS) and Wisconsin Department of Transportation Standards. The material in this Bridge Manual is supplemental to these specifications and takes precedence over them.

All highway bridges are to be constructed according to State of Wisconsin, Department of Transportation, Division of Highways and Transportation Services Standard Specifications for Road and Bridge Construction and applicable supplemental specifications and special provisions as necessary for the individual project.

All railroad bridges are to be designed to the specifications of the American Railway Engineering Association (AREA) Manual for Railway Engineering and the specifications of the railroad involved.

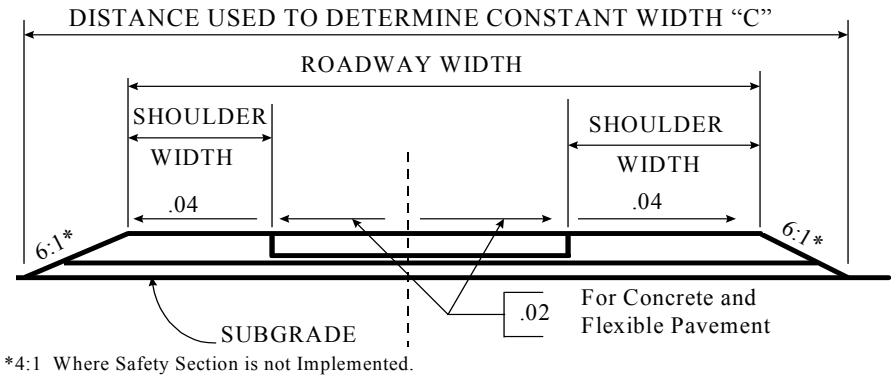


FIGURE 3.1 TANGENT SECTION-SINGLE OR DIVIDED HIGHWAY

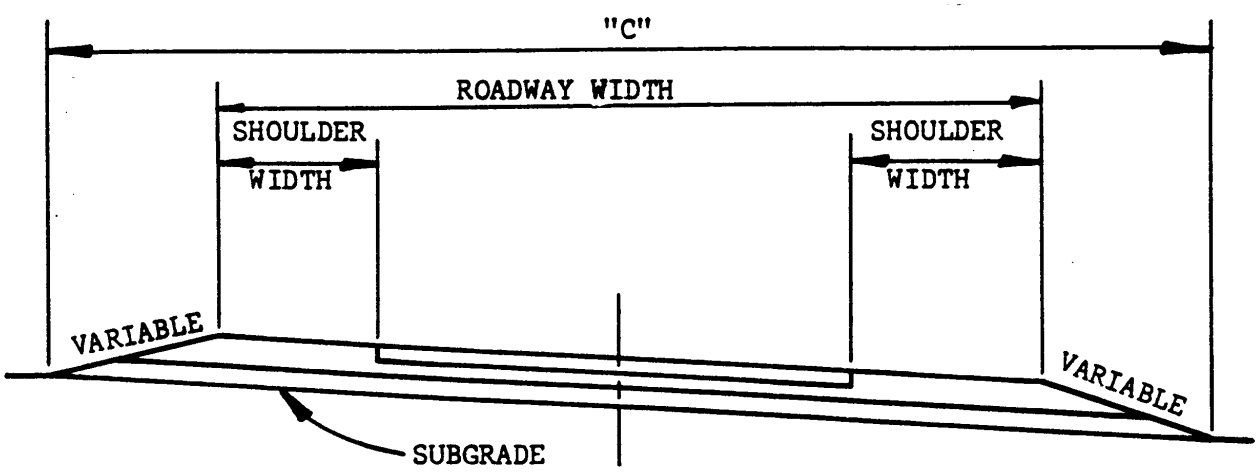
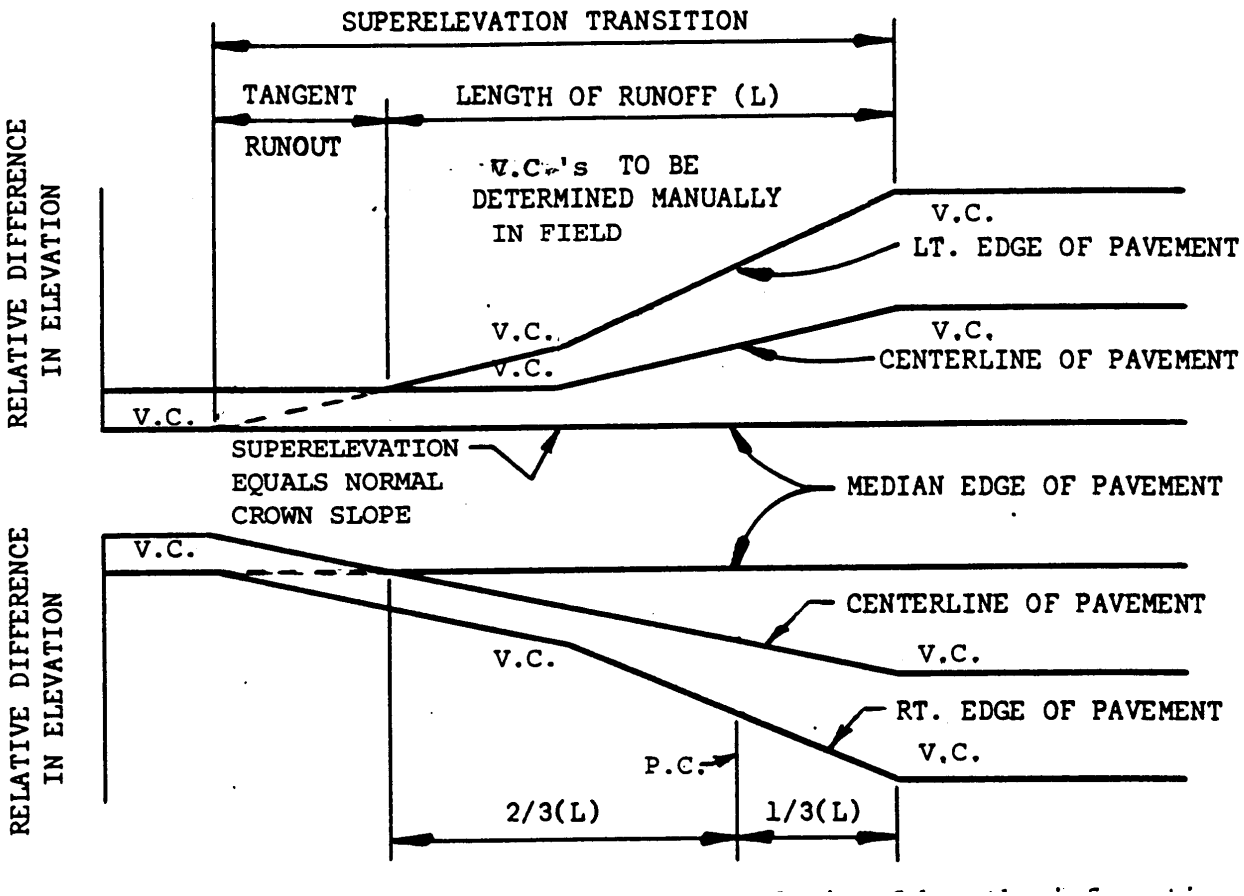


FIGURE 3.2 SUPERELEVATED SECTION-SINGLE OR DIVIDED HIGHWAY



NOTE: Illustrated above is a graphic analysis of how the information from Figure 3.4 is used to compute grades through the Superelevation Transition of a Divided Highway Project. Below a two lane highway is shown.

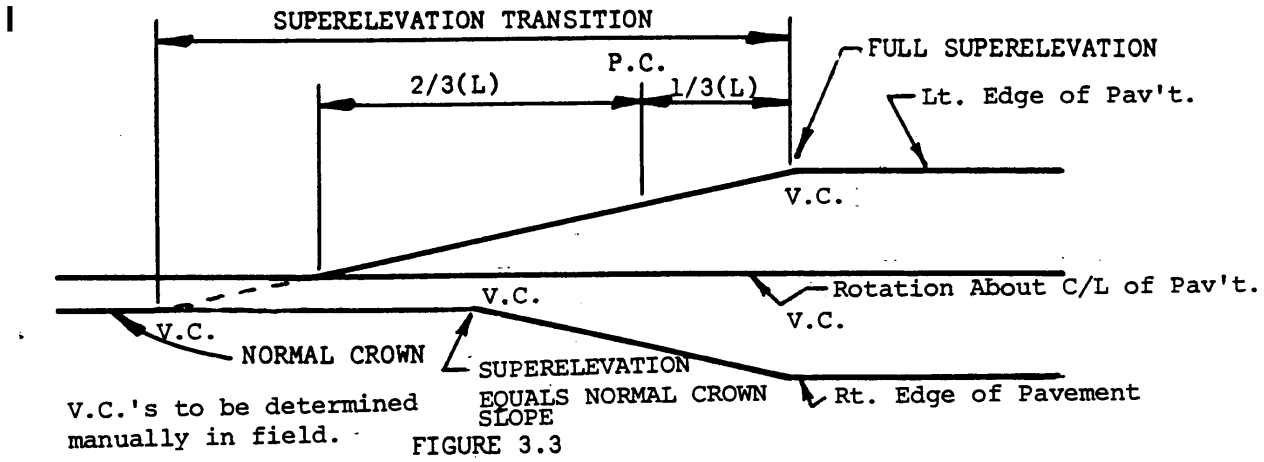
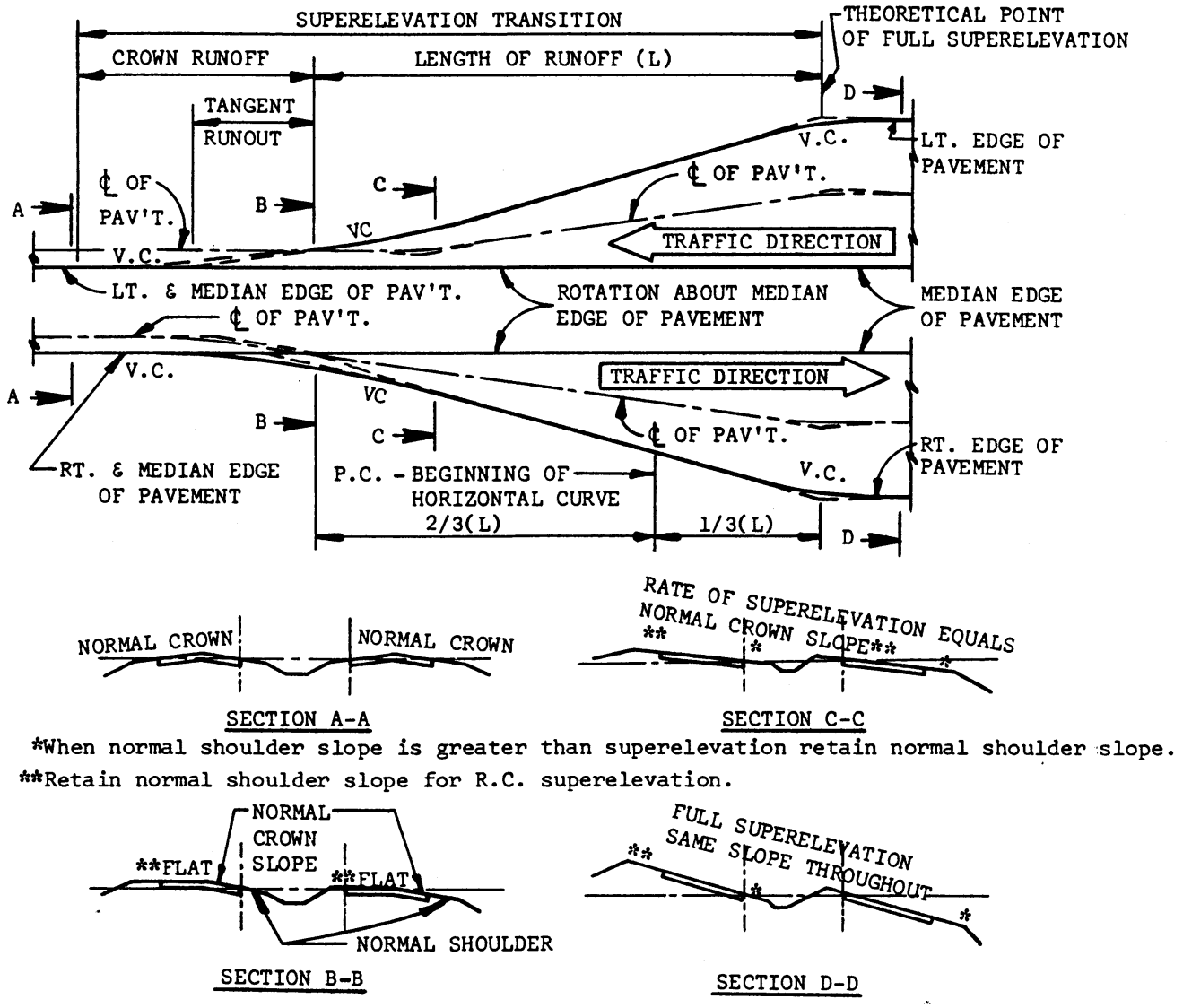


FIGURE 3.3



Superelevation rotation is about median edges of pavement. Curve shown is a horizontal curve to right.

V	-	Design Speed	R.C.	-	Remove Crown, Superelevate at Normal Crown Slope, retain slope on both shoulders.
D	-	Degree of Horizontal Curve			
N.C.	-	Normal Crown Slope, i.e. Rigid - 0.2 Flexible - 0.02	P.C.	-	Point of Curvature
			V.C.	-	Vertical Curve

FIGURE 3.4 SUPERELEVATION DETAILS FOR RURAL DIVIDED HIGHWAYS

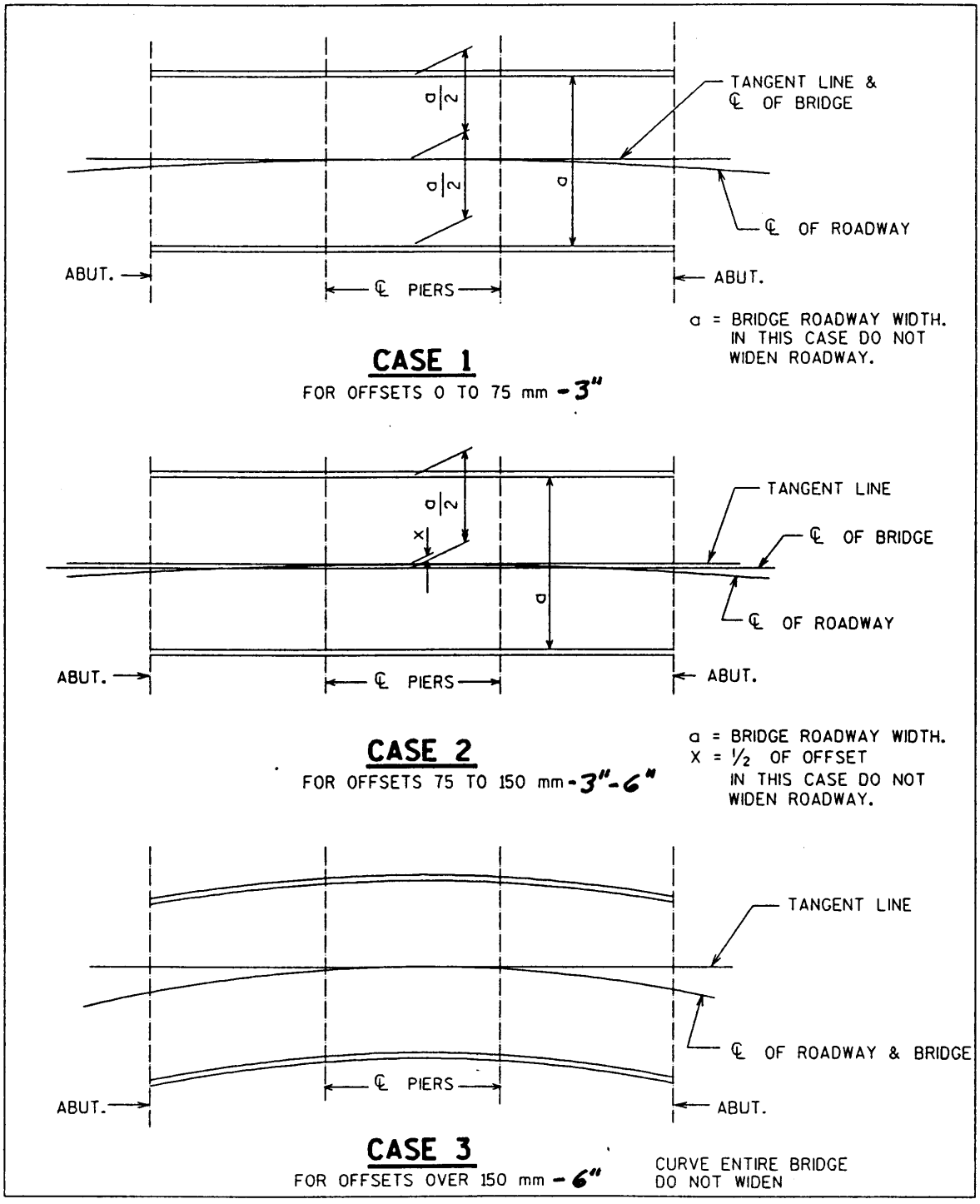

TANGENT LINE &
℄ OF BRIDGE
a/2
a/2
a
℄ OF ROADWAY
ABUT.
℄ PIERS
ABUT.
a = BRIDGE ROADWAY WIDTH.
IN THIS CASE DO NOT
WIDEN ROADWAY.
CASE 1
FOR OFFSETS 0 TO 75 mm - 3"
TANGENT LINE
a/2
X
℄ OF BRIDGE
a
℄ OF ROADWAY
ABUT.
℄ PIERS
ABUT.
CASE 2
FOR OFFSETS 75 TO 150 mm - 3"-6"
a = BRIDGE ROADWAY WIDTH.
X = ½ OF OFFSET
IN THIS CASE DO NOT
WIDEN ROADWAY.
TANGENT LINE
℄ OF ROADWAY & BRIDGE
℄ PIERS
ABUT.
ABUT.
CASE 3
FOR OFFSETS OVER 150 mm - 6"
CURVE ENTIRE BRIDGE
DO NOT WIDEN

FIGURE 3.5